(No Model.) 2 Sheets—Sheet 1.

C. MEADOWCROFT & P. DENANHOUER.

APPARATUS FOR DYEING SKEINS.

No. 359,806. Patented Mar. 22, 1887.

Fig. 1.

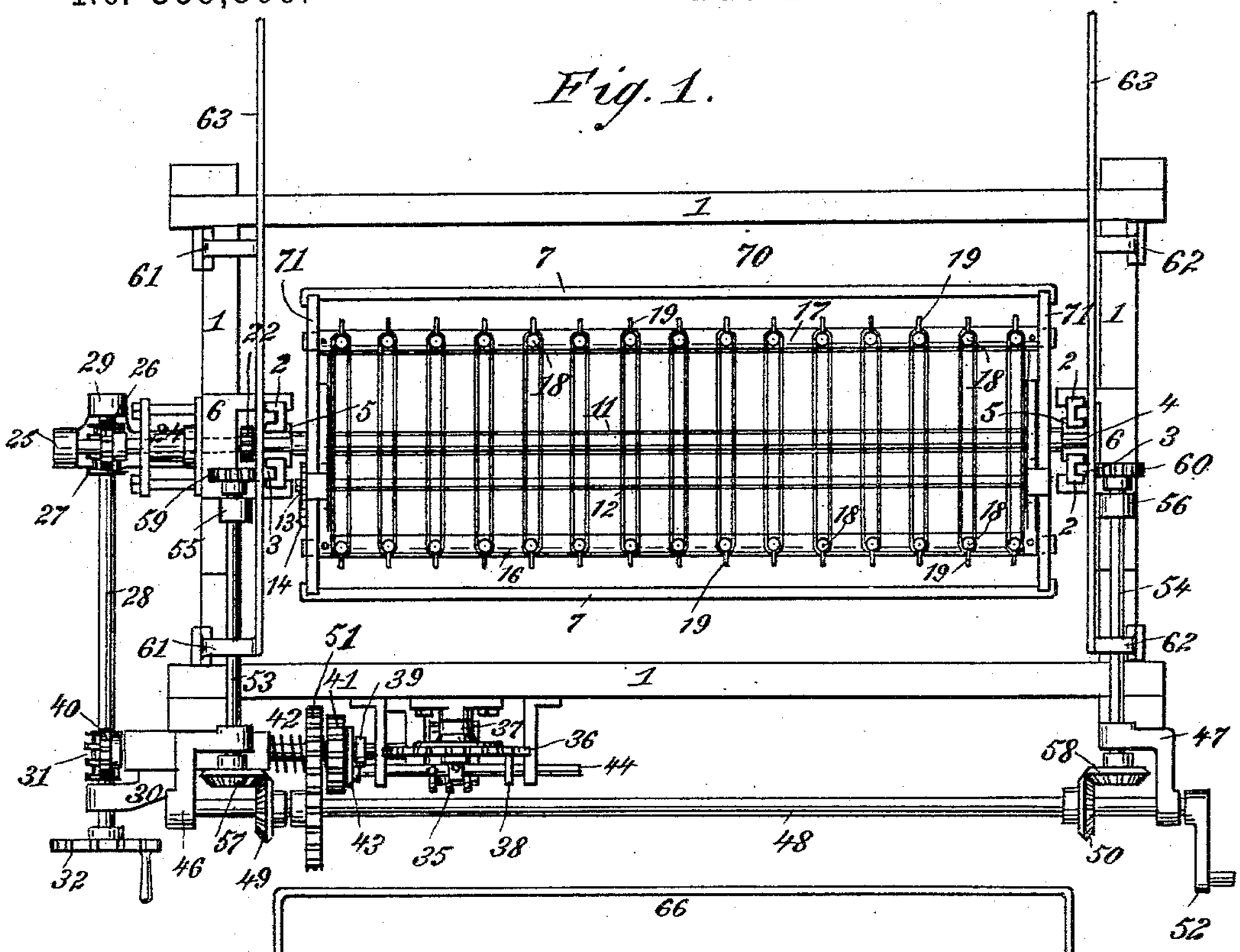

Fig. 2.

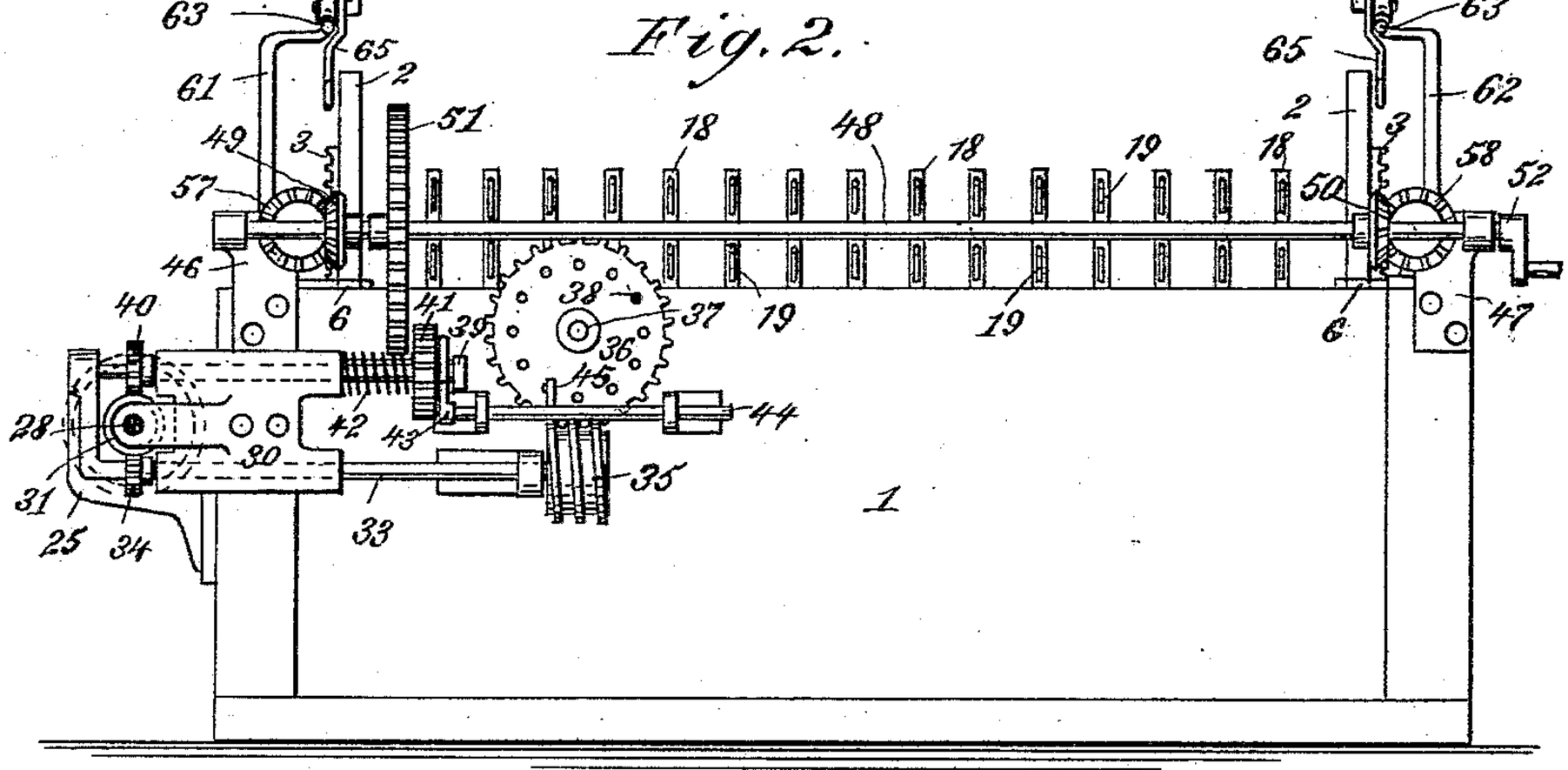

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Fig. 3.

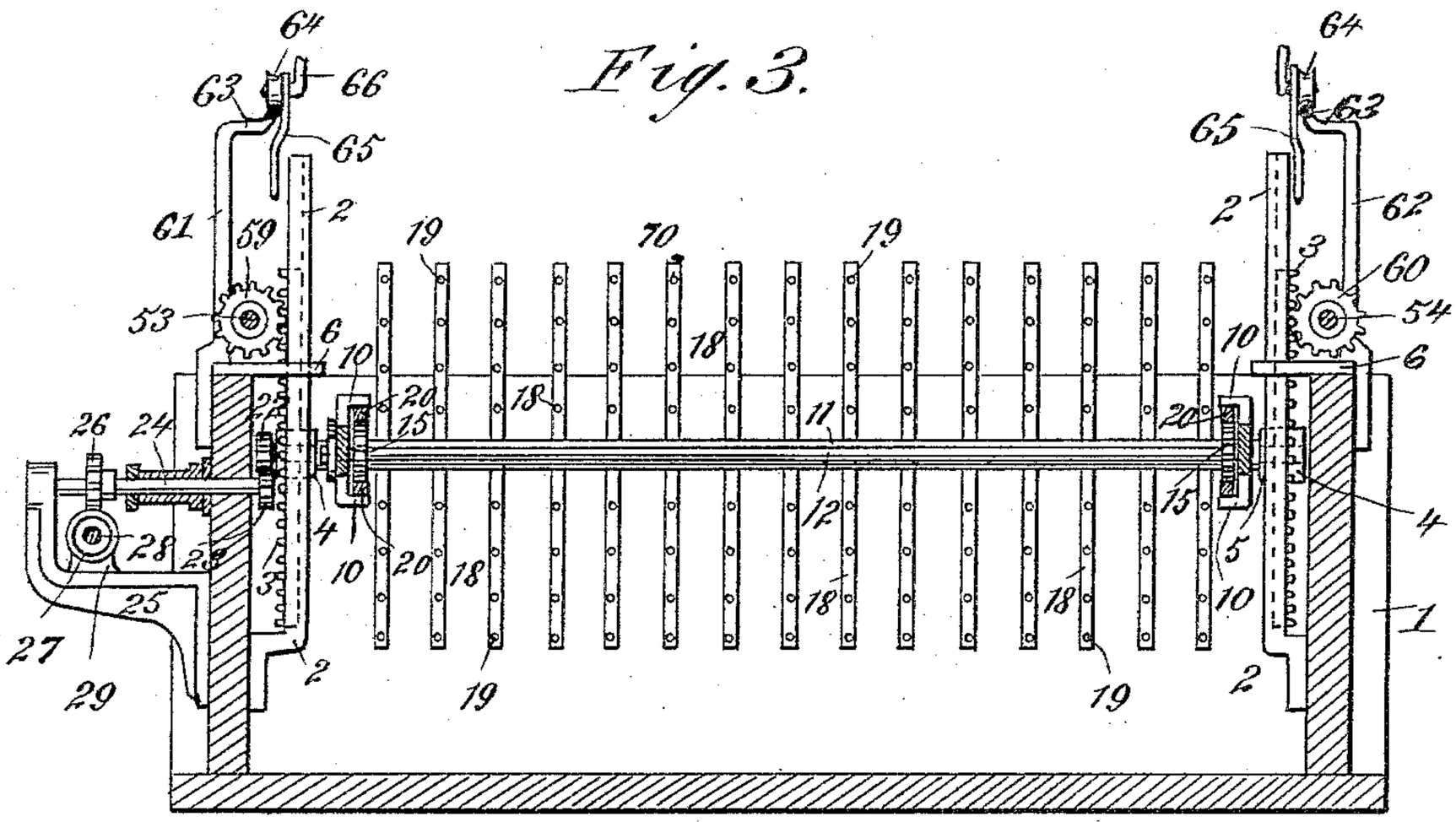

Fig. 4.

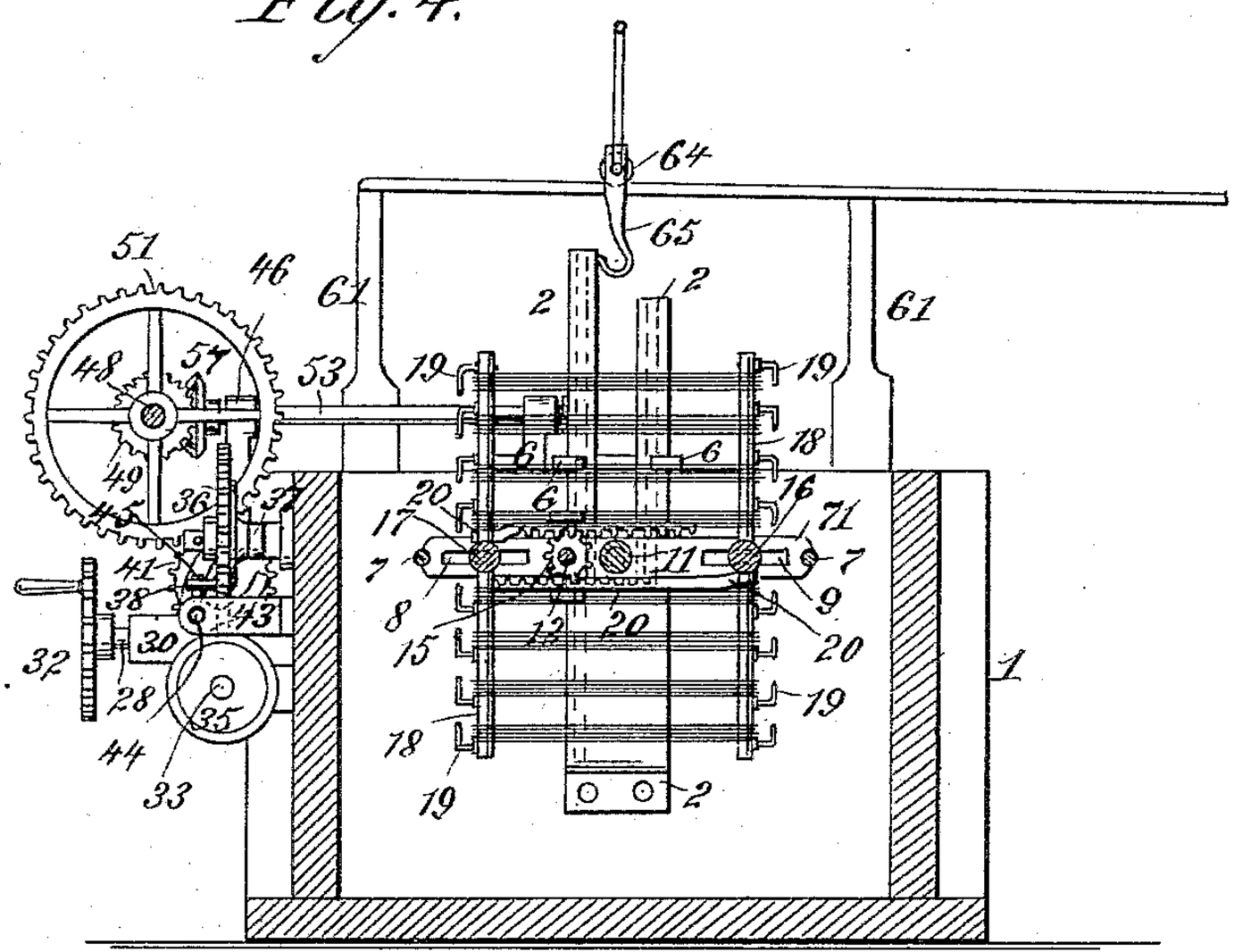

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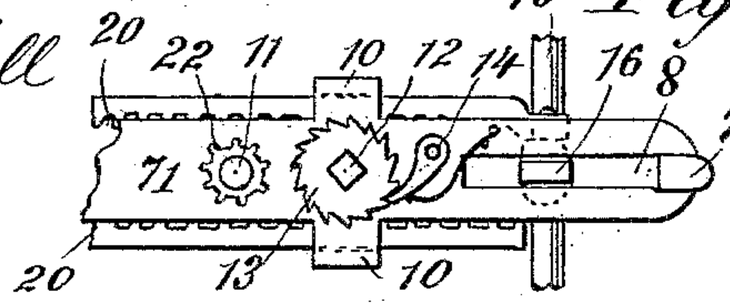
Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES MEADOWCROFT AND PETER DENANHOUER, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR DYEING SKEINS.

SPECIFICATION forming part of Letters Patent No. 359,806, dated March 22, 1887.

Application filed September 18, 1886. Serial No. 213,914. (No model.)

To all whom it may concern:

Be it known that we, CHARLES MEADOWCROFT and PETER DENANHOUER, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and Improved Apparatus for Dyeing Skeins, of which the following is a full, clear, and exact description.

Our invention relates to an apparatus for dyeing skeins of silk, wool, or any similar product, and has for its object to produce a machine of simple construction wherein the number of revolutions of the carrying-frame is readily governed, and wherein when the set number of revolutions has been reached the said carrying-frame will be automatically elevated from within the vat. Our object is also to produce a frame for carrying the skeins readily adjustable to any size of said skein, and wherein the same will not become tangled in process of dipping, each skein being entirely separated from the others.

The invention consists in the construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of our apparatus, and Fig. 2 a front elevation thereof. Fig. 3 is a central longitudinal vertical section, and Fig. 4 a transverse vertical section, of the same. Fig. 5 is a detail view of the adjusting device of the reel.

The vat 1 is provided centrally at the ends upon the inside with U-shaped standards 2, which standards extend from a point above the floor of the vat vertically upward above the upper edges thereof. One arm of each standard 2 is grooved longitudinally upon the outer side to receive a rack, 3, adapted to slide therein, which rack is made integral with or connected to the journal-boxes 4. The said boxes, placed between the vertical arms of the standards 2, are provided with outwardly-projecting lugs or wings 5 upon their inner faces, adapted by the engagement of said lugs with the standards to steady their vertical movement between the same. The standards 2 are braced near the top through engaging horizontal arms integral with plates 6, secured to the top edge of the vat back of the standards.

A frame, 70, preferably constructed of two longitudinal rods, 7, connected by two flat end pieces, 71, the said end pieces being provided at one end with slot 8 and at the other end with a similar slot, 9, together with outwardly-projecting lugs 10, having inwardly-curved ends, is adapted for suspension within the vat between the standards by means of a shaft, 11, which, extending through the ends of the frame, is journaled in the sliding boxes 4. The said shaft 11 is secured rigidly to the frame. Between the longitudinal fixed shaft 11 and one extremity of the end of the frame near said shaft a second light longitudinal shaft, 12, is journaled in the end pieces, one end of which shaft 12 is projected through the end piece of the frame and flattened, to receive, when necessary, an ordinary crank or key. Upon the said shaft 12, outside of and bearing slightly against the aforesaid end piece of the frame, a wheel, 13, is keyed adapted for engagement with a pawl, 14, pivoted to the frame above it. Toothed wheels 15 are also keyed upon the rotary shaft 12 at each end near the inner faces of the said slotted end pieces of the frame 70, for a purpose hereinafter set forth.

Into the slots 8 and 9 of the end pieces of the frame 70 longitudinal bars 16 and 17 are entered, having secured thereto in any suitable manner a series of parallel arms, 18, arranged transversely the length of said longitudinal bars equidistant apart, and provided upon their outer surfaces with consecutively-arranged pins 19, having their ends bent over in the same plane in the direction of their longitudinal carrying-bars 16 and 17. The said longitudinal carrying-bars 16 and 17 are provided at each end, upon the same side of each bar, with racks 20, the racks of the bar 16 being attached upon the side opposite to those of the bar 17, and the said racks are held in engagement with the toothed wheels 15 upon the rotary shaft 12 by the side projections, 10, of the frame, which projections constitute guides for the said racks. Thus, by means of a crank engaging the square projecting end of the rotary shaft 12, Figs. 3 and 5, the distance between the opposite series of

transverse arms 18, having the attached hooks 19, can be regulated to suit the length of skein to be carried thereby; and when the said arms are properly distanced they are securely held in the desired position by the engagement of the pawl 14 with the ratchet-wheel 13 upon the rotary shaft 12.

One end of the fixed shaft 11 of the frame 70 projects beyond the journal-box 4, and is provided with a small gear-wheel, 22, which meshes with another gear-wheel, 23, beneath it, of equal size, keyed upon the shaft 24, Fig. 3. This shaft is entered through the vat in suitable bearings at the end thereof, the outer end of said shaft 24 being journaled in a bracket, 25, attached to the casing of the vat. A worm-wheel, 26, is keyed upon the short longitudinal shaft 24, near its bearing in the bracket 25, adapted to mesh with a worm, 27, keyed upon a transverse shaft, 28, which finds a bearing at one end in a vertical standard, 29, integral with the side of the said bracket 25. The other end of said shaft 28 is journaled in one arm of a bracket, 30, attached to the front of the vat at the end thereof. At this point the shaft 28 is provided with a worm, 31, attached thereto, together with a hand-wheel, 32. By turning this hand-wheel through the medium of the shafts 24 and 28 and the gearing connected with said shafts, as above described, the frame 70 is revolved in the journal-boxes 4 within the vat, and the skeins of wool, silk, or other material carried by said frame dipped in the dyeing-fluid. Through bracket 30, and journaled therein, a short lower longitudinal shaft, 33, is projected to extend out at the end of the box and carry a worm-wheel, 34, adapted to mesh with the worm 31 of the transverse shaft 28. The other end of the said lower short shaft, 33, suitably supported in a bracket attached to the front side of the vat, is furnished with a large worm, 35, keyed thereto. The said worm 35 is adapted to mesh with a toothed clock, 36, held to revolve upon a horizontal shaft, 37, secured to the side of the vat 1 near the top edge. The said clock is provided with a series of equidistant apertures concentric with and a given distance from its periphery. The said apertures, which may be numbered consecutively from 1 to 20, or more, upon the face of the clock, are adapted to receive a pin, 38, (shown in Fig. 1,) the object of which will be hereinafter set forth.

Through an upper longitudinal arm in the side bracket, 30, a second short side shaft, 39, is journaled, and on the end projecting from said arm at the corner of the vat a worm-wheel, 40, is keyed, which meshes with the worm 31 of the transverse shaft at the top. The inner end of said shaft 39 is provided with a pinion, 41, keyed to slide thereon and bear against a coil or spiral spring, 42, intervening between the end of the said arm and the face of said pinion. A slotted plate, 43, is made to bear against the opposite face of the pinion 41, which plate is attached to the end of a sliding horizontal bar, 44, held suspended in front of the clock 36, and nearly in line with the lower edge thereof, by suitable horizontal standards secured to the front side of the vat, preferably upon each side of said clock. A vertical upwardly-projecting pin, 45, is provided, with the sliding bar 44 so located thereon as that when the said bar is in its normal position the said pin will register centrally the clock-face at the lower portion thereof.

At the upper corner of the vat, above the central end bracket, 30, another bracket, 46, is secured, provided with an arm extending outwardly at an angle thereto and an upwardly-extending vertical arm, the said outwardly-projecting arm being located at or near the corner edge, and the vertical arm next to and inside the said outwardly-projecting arm of the bracket. A similar bracket, 47, is provided at the opposite end of the vat upon the same side, both brackets being secured in any suitable manner.

An outer longitudinal shaft, 48, adapted to extend from end to end of the vat, is journaled in the outwardly-projecting arms of the brackets 46 and 47, and fitted with bevel-gears 49 and 50, keyed thereon near each end, together with a large toothed wheel, 51, (which also acts as a balance,) keyed thereto near the bevel-gear 49. The said shaft 48 is further provided with a crank-arm, 52, at the opposite end.

At each end of the vat above the top edge transverse shafts 53 and 54 are journaled—at one end in the vertical arms of the said brackets 46 and 47, and at the other end bearings are found in standards 55 and 56, secured to the top edge of the vat near the center thereof. The said transverse shafts 53 and 54 are provided with bevel-gear 57 and 58 at their outer ends, adapted to mesh with the similar gears, 49 50, upon the shaft 48, and the said upper transverse shafts, 53 and 54, are provided at their inner ends with spur-wheels 59 and 60, adapted to engage the vertical racks 3 of the U-shaped standards 2.

The upper side and end gearing is purposed to raise or lower the frame within the vat, and can be worked independently by means of its crank 52. It is, however, to be used in conjunction with and operated by the lower end transverse shaft, 28, the engagement being made at the proper time through the clock 36. The distance between each aperture in the clock represents one complete turn of the frame. If the nature of the material to be dyed requires to be dipped fifteen times, that number of apertures are counted from the one opposite the vertical pin 45 of the sliding bar 44 around the clock from right to left, and the horizontal pin 38 inserted in the fifteenth aperture. When the frame has been rotated fifteen times by the crank upon the shaft 28, the horizontal pin in the clock engages the vertical pin 45 of the sliding rod 44, causing the said rod, by means of its slotted plate 43, to engage the pinion 41 with the large toothed wheel 51 on the shaft 48, which communicat-

ing motion to the upper transverse shafts, 53 and 54, they in turn, through the spur-wheels keyed upon them, cause the sliding racks 3 and boxes 4, carrying the frame 70, to be elevated vertically, the rotary motion of the frame thereon ceasing. When the frame has been elevated above the line of the box, the vertical motion is stopped and the frame conveyed to another vat for washing, by means hereinafter described.

Standards 61 and 62 are secured to the ends of the box, purposed to support transverse tracks 63 above the vat, which tracks may communicate to another cleansing-vat near by, and upon these tracks sheaves 64, carrying pendent hooks 65, are adapted to travel, said sheaves being united by a straight or bent rod, 66, of the proper gage, which rod acts as a brace for the sheaves and a means for guiding them. The hooks 64 are placed under the ends of the main shaft of the frame, and by the use of the connected sheaves traveling upon the said track the frame is readily, quickly, and easily removed.

The hanks of silk, wool, or material to be dyed are carried under the hooks and over the parallel transverse bars of the frame, as shown in Figs. 1 and 4, the frame being readily adjusted to any length of hank, as hereinbefore described.

The main shaft 28 and the outer longitudinal shaft 48 may be fitted with proper pulleys and operated by power, if desired.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a vat having attached thereto U-shaped standards, of a frame journaled in said standards, provided with oppositely-faced parallel arms having hooks consecutively arranged upon their outer faces, and means for revolving said frame, substantially as shown and described, and for the purpose herein set forth.

2. The combination, with a vat having attached thereto U-shaped standards, of a slotted frame having adjustable longitudinal bars, said bars provided with a series of transverse oppositely-faced parallel arms having hooks consecutively arranged upon their outer faces, together with means for revolving said frame, substantially as shown and described, and for the purpose herein set forth.

3. The combination, with a vat having attached thereto U-shaped standards, of a slotted frame provided with adjustable longitudinal bars carrying a series of transverse oppositely-faced arms fitted upon their outer faces with consecutively-arranged hooks and racks attached to said longitudinal bars, a shaft journaled in said frame, provided with toothed wheels adapted to engage said racks, and a ratchet-wheel adapted to engage a pawl pivoted to the frame, together with means for rotating said frame, substantially as shown and described, and for the purpose herein set forth.

4. The combination, with a vat provided with vertical U-shaped standards and journal-boxes having integral vertical racks adapted to slide in said standards, of a slotted frame journaled in said boxes, provided with adjustable longitudinal bars carrying a series of transverse oppositely-faced arms fitted upon their outer faces with consecutively-arranged hooks and racks attached to said longitudinal bars, a shaft journaled in said frame fitted with toothed wheels adapted to engage said rack, and a ratchet-wheel adapted to engage a pawl pivoted to said frame, together with means for raising and lowering the frame within the said standards, substantially as shown and described, and for the purpose herein set forth.

5. In an apparatus for dyeing skeins, a frame adapted to be journaled in the vat, provided with slots 8 and 9 in the ends thereof, adjustable longitudinal bars 16 and 17, having oppositely-faced horizontal arms 18, fitted with consecutively-arranged inwardly-bent hooks 19 and vertical racks 20, together with a shaft, 12, journaled in said frame, fitted with toothed wheels 15, adapted to engage said racks, and a ratchet-wheel, 13, adapted to engage a pawl, 14, pivoted to the side of said frame, substantially as shown and described, whereby the carrying-bars are made adjustable to different length of skeins, as set forth.

6. The combination, with a vat provided with vertical U-shaped standards 2, fitted with sliding boxes 4, having integral racks 3, and upper brace-plates, 6, for said standards, of the adjustable yarn-carrying frame 70, journaled in said boxes, together with means for elevating said frame, substantially as described, whereby said frame when elevated can be removed from the vat, as set forth.

7. The combination, with a vat provided with vertical U-shaped standards 2, fitted with sliding boxes 4, having integral racks 3, and upper brace-plates, 6, for said standards, upper standards, 61 and 62, tracks 63, traveling sheaves 64, having attached hooks 65, and brace-rods 66, of the adjustable yarn-carrying frame 70, journaled in said boxes, together with means for elevating said frame, substantially as described, whereby said frame when elevated is removed from the vat, as set forth.

8. The combination, with a yarn-carrying frame, 70, journaled in U-shaped standards attached to the inner side of a vat and provided with a gear-wheel, 22, at one end of the shaft 11 of said frame, of the short longitudinal shaft 24, provided at its outer end with a worm-wheel, 26, and at its inner end with a gear-wheel, 23, together with the shaft 28, journaled at right angles to said shaft 24, provided with a worm, 27, at the rear end thereof, and also with a hand-wheel, 32, at its forward end, as shown and described, whereby a rotary motion can be imparted to said frame, as set forth.

9. The combination, with a yarn-carrying frame, 70, journaled in boxes 4, having integral racks 3, adapted to slide in U-shaped standards 2, attached to the inner side of a

vat, of the outer and upper longitudinal shaft, 48, having keyed thereon at each end a bevel-gear, 49 and 50, and a large toothed wheel, 51, the said shaft being also provided with a crank-arm, 52, together with the upper transverse shafts, 53 and 54, each provided with a spur-wheel, 59 and 60, at their inner ends, adapted to engage the said racks 3, and bevel-gear 51 and 58 at their outer ends, purposed to mesh with the said bevel-gear 49 and 50, substantially as shown and described, whereby the said frame is raised and lowered within said standards, as set forth.

10. The combination, with a yarn-carrying frame arranged for rotation in a vat and provided with vertical racks 3 at its ends, of an apertured dial, 36, revolved from the operating-shaft of the reel, a longitudinal shaft, 48, parallel with said reel, carrying a gear, 51, and gearing with transverse shafts 53 and 54, carrying spur-wheels engaging the racks 3, a shaft, 39, parallel with the said shaft 48, engaging the driving-shaft 28 of the reel, and carrying a loosely-mounted pinion, 41, adapted to engage the gear-wheel 51 on shaft 48, a rod, 44, passing in front of the dial and bearing at one end on the pinion 41 on the shaft 39, and provided opposite the dial with a pin, 45, and an adjustable pin, 38, in the dial, substantially as and for the purpose herein set forth.

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Witnesses:
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